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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/812,817 | 03/21/2001 | Shigeru Mori | 048369/0121 | 1909 |

7590 11/06/2002

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[REDACTED] EXAMINER

PATEL, ISHWARBHAI B

[REDACTED] ART UNIT [REDACTED] PAPER NUMBER

2827

DATE MAILED: 11/06/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|----------------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 09/812,817 | MORI, SHIGERU |
| | Examiner Ishwar (I. B.) Patel | Art Unit 2827 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on ____.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.
Disposition of Claims
 4) Claim(s) 1-10 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
 5) Claim(s) ____ is/are allowed.
 6) Claim(s) 1-10 is/are rejected.
 7) Claim(s) ____ is/are objected to.
 8) Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 21 March 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 11) The proposed drawing correction filed on ____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. ____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>3,4</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because the figures are improperly cross hatched.

The cross hatching patterns should be selected from those shown on page 600-81 of the MPEP based on the material of the part. See also 37 CFR 1.84(h)(3) and MPEP 608.02.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 and 5-8 rejected under 35 U.S.C. 103(a) as being unpatentable over Susko et al., US Patent No. 6,177,728, hereafter Susko.

Regarding claim 1 and 7, Susko disclose a printed wiring board comprising:

a printed wiring substrate (carrier 82, see figure 4, column 4, line 58-67), and

a thermal expansion buffering sheet having a lower coefficient of thermal expansion than said printed wiring substrate, which is integrally laminated on a surface of said printed wiring substrate (layer 86 of thermoplastic polymer, see figure 4, column 4, line 58-67);

except not explicitly disclosing the substrate includes plurality of wiring layers. Susko however, discloses that the invention can be used for multi-layer circuits (see abstract). Further, single layer, double layer and multiplayer substrate with various design features are known in the art and can be used depending upon the specific requirement. Multilayer circuits, in particular, are used for better routing of traces with increased component density. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the substrate of Susko with multilayer structure for better trace routing and increased component density.

Regarding claim 2, Susko further discloses the coefficient of thermal expansion of said printed wiring substrate is 15 to 25 ppm, column 3, line 5-20, and thermal expansion of the expansion sheet can be adjusted between 5 to 20 ppm, column 4, line 10-55, which is in the claimed range.

Regarding claim 3, Susko further discloses the printed wiring board made of glass filled epoxy (printed circuit boards and other substrates manufactured with organic dielectrics such as glass filled epoxies, column 3, line 5-25).

Regarding claim 5, Susko further discloses an electrode pattern on the surface of said thermal expansion buffering sheet (Susko - contacts and other conventional circuitry are applied to the top of thermoplastic layer 86, column 4, line 58-67).

Regarding claim 6, Susko further discloses the part to be mounted via solder ball (chip 12 attached to a circuitized organic dielectric multilayer carrier 102 with C4 connection, column 5, line 6-15).

Regarding claim 8, Susko discloses all the features of the claimed invention including electrode pattern on the buffering layer as applied to claim 1 and 5 above.

4. Claims 4, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Susko et al., US Patent 6,177,728 and further in view of Buchanan et al., US Patent No. 4,963,425.

Regarding claim 4, though Susko does not disclose the thermal expansion buffering sheet made of an aramid, any known material can be used depending upon the specific requirement and aramid is known in the art. Buchanan discloses one such

use of aramid for controlling the thermal expansion of a printed wiring board. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of Susko with the thermal expansion buffering sheet made of an aramid as taught by Buchanan in order to control the total thermal expansion of the device.

Regarding claim 9 and 10, the modified assembly of Susko discloses all the features of the claimed invention including the buffering sheet made of aramid as applied to claims 1 and 4 above.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ishikawa et al., Ogino et al., Lo, Jensen, Hedrick et al., Horiuchi et al., McMahon et al., Jimarez et al., disclose the circuit board assembly similar to applicant's claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers

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for the organization where this application or proceeding is assigned are (703) 305 3431
for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or
proceeding should be directed to the receptionist whose telephone number is (703) 308
0956.

ibp
October 26, 2002

Albert W. Paladini 11-1-0
ALBERT W. PALADINI
PRIMARY EXAMINER